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whole continuance of the experiment, had been the decomposition of a portion of the water employed, and the separation, in a pure state, of the oxygen and hydrogen gases of which it was formed. The society is therefore of opinion, that M. Pacchiani is deceived respecting the nature of the acid which he announced he had obtained, or that this acid may have come from some animal or vegetable substance employed in his apparatus. They do not hesitate to declare that to the apparatus employed by themselves they give the preference, as the simplest and most remote from any foreign influence; and they do not believe that it is possible to produce any thing by the action of the Galvanic pile, except the decomposition of a greater or less proportion of the water submitted to its action.

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XXXI. *Extract of a new Letter of Dr. FRANCIS PACCHIANI, Professor of Natural Philosophy in the University of Pisa, to M. FABRONI, upon the Composition of the Muriatic Acid\*.*

THE efforts which the best naturalists have hitherto made to explain in what manner water is decomposed by means of the electrical column, and to give an account, with precision, of the important questions which have arisen on this subject, demonstrate that the principles from which they set out, in order to attain their object, were far removed from being an immediate result of facts clearly ascertained, and that they were given to the public without regard to the inductions of science.

When hypotheses are established by analogy, if they do not perplex the mind of the philosophical observer, they certainly will be of great assistance to him in his research after truth; but when they are too hastily erected into principles, instead of aiding the judgment, they hinder it from displaying itself, and arriving at those sublime truths which are the object of its labours.

\* From *Annales de Chimie*, tome lvi.

I have already sufficiently indicated the method I followed in order to generalize the results I announced ; and I have demonstrated that not only gold and platina, but all the metals and metallic bodies, in short all substances proper for decomposing water, as soon as they are traversed by an electrical current strong enough to disengage oxygen, have the property of converting water into oxygenated muriatic acid. This change of nature, this metamorphosis (if I may be permitted so to express myself) of water, fills with astonishment the philosopher who contemplates it, and who comprehends the useful consequences which may be derived from it.

For a long time I have been occupied with this subject, and this result enters into the course of experiments which I made and communicated to M. Viltosio Fossombroni. But have the people who repeated my experiments read my letters with a tranquil spirit, laying aside all the hypotheses already received? Did they make use of the method which I indicated?—Certainly not.

My assertion is so true; that some celebrated chemists, in spite of what I observed in my letters, introduced into the apparatus two metallic wires, making one of them communicate with the positive pole, and the other with the negative pole of the electrical column. How is it possible to obtain, by such a method, the conversion of the water into oxygenated muriatic acid? It is a fact recognised by every naturalist, that the wire which communicates with the positive pole disengages pure oxygen, while the other which communicates with the negative pole disengages from the water very pure hydrogen ; it is likewise equally obvious, that the two gases into which the water gradually converts itself, develop themselves in such a proportion, that if they lose their elasticity they will again recompose the same volume of water, equivalent in weight to that of the two gases.

I ask, at present, How, after these facts, it could be pretended that the liquid which remains from the decomposition could convert itself into oxygenated muriatic acid? But let us proceed a step further : the molecu<sup>læ</sup> of water which are deoxygenated by the contact of the wire of the

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positive pole, being deprived of their elasticity, could not they combine themselves immediately with the other moleculæ of water abandoned by hydrogen in the neighbourhood of the wire of the negative pole of the electrical column, since they are equally deprived of elasticity? The thing is self-evident: in fact, if moleculæ of oxygen and hydrogen deprived of elasticity, and in the necessary proportions to form water, could enter into immediate combination and not form water, it would be impossible that water could exist at all.

These considerations did not escape the celebrated Humboldt and Gay-Lussac: they understood extremely well that in the experiment of the English chemists the water could not be oxygenated and hydrogenated but for a single moment alone; seeing that the total absorption of hydrogen on one side, and of oxygen on the other, shows that the water is really neither hydrogenated nor oxygenated; because, in order to become so, it would be necessary that it should absorb one of the two gases in a proportion different from that required for the composition of water: then, if it absorbs these two gases in the proportion indicated, we ought to conceive that the properties of one of these would be neutralized by those of the other, and that consequently, in the experiment quoted, the water might hydrogenate or oxygenate itself for a single moment, but that it could not remain in this state in a permanent manner, for the reason already mentioned.

But to return to our subject, which is to resolve the problem of the solution upon which the conversion of water into oxygenated acid depends.

A volume of water, distilled and deprived of air, being given, decompose it in such a manner that the element of which it ought to clear itself gradually may be very pure oxygen.

#### *Solution.*

Take a glass tube of any form you please, provided that it has two orifices, the one small and rounded, the other of a diameter large enough to introduce the water without trouble: through the first of these orifices make a gold wire  
pass

pass and seal it up with wax ; then fill the tube with distilled water, and place in it two or three layers of white linen moistened ; seal it up by fixing the linen to the extremity of the tube. Plunge the tube by this last extremity into a vessel containing very pure water. By means of several moistened slips of spongy paper make the water of this vessel communicate with the negative pole of a column sufficiently energetic ; and, finally, make the gold or platina wire communicate with the positive pole of the electrical column. The energy of this column being proportioned to the number of pairs of metallic plates, to their state, and to that of the humid conductors, would be, as is well known, proportioned to the capacity of the tube which contains the water under experiment. As soon as the circle is completed, it will establish an uninterrupted circulation, and by this means the water will gradually clear itself of oxygen, passing it off by the wire of gold or platina.

This astonishing change of water into oxygenated muriatic acid creates an agreeable surprise in the mind : *Felix qui potuit rerum cognoscere causas*. After having resolved this important problem, I proposed another to myself, which was as follows :

A volume of water, distilled and freed as much as possible from air, being given, it is proposed to extract the hydrogen from it.

#### *Solution.*

Take a glass tube with two orifices, the one straight and without any sharp edge, the other with a stopper, and of a diameter sufficient to introduce the distilled water without trouble. Introduce through the smallest orifice a wire of gold, platina, or other metal, and seal it hermetically with wax. Fill this tube with distilled water freed from air, close the other orifice with fine linen moistened with water folded three or four times ; plunge the tube on the side of this second orifice into a vessel containing pure water ; plunge into this water slips of spongy paper which communicate by the other extremity to the positive pole of the electrical pile. Finally, make the metallic wire communicate with the negative pole of this same pile. This being done, a

circulation of the electrical fluid, as is well known, will commence, which gradually makes a quantity of air escape near the metallic wire, which, being analysed, is found to be almost wholly pure hydrogen.

By this new method of decomposition we obtain water very much oxygenated, as is positively proved by the experiment I have given in my *Opuscles*.

If that which several philosophical physicians have asserted be true, that oxygen is an excellent remedy in cutaneous diseases, the philanthropist may have recourse to the electrical column to obtain oxygenated water, and make numerous experiments useful to society. In short, what simpler vehicle could we choose, by means of which to introduce oxygen into the human body, than a liquid so necessary to life?

### XXXII. *Proceedings of Learned Societies.*

#### ROYAL SOCIETY OF LONDON.

**FEB. 27.** The Right Honourable Sir Joseph Banks, President, in the chair.—A paper by Mr. Home, “on a particular affection of the prostate gland,” was read. It was illustrated by a drawing exhibiting minutely the situation and figure of this newly discovered gland, or rather peculiar nipple-formed elongation of a part of the substance of the prostate gland protruding against the bladder. This disease, which so painfully affects the bladder, has hitherto been irremediable, chiefly from its true cause not being known; and it is hoped that this physiological discovery may be of incalculable advantage towards relieving the sufferings of patients supposed to be labouring under the effects of calculi and other urinary diseases.

**March 6.** The President in the chair.—The reading of a communication from Dr. Herschel, “on the quantity and velocity of the solar motion,” was commenced.

**March 13.** The President in the chair.—Continuation of the above paper, much of which was of a nature not to be read, being mathematical tables of the relative distances of the